ward movement of the frame 17 is so limited that when in its lowermost position the edges of the stacks will be directly opposite said discharge-openings, respectively. These openings are of such width as will deliver a sufficient volume of water, a width of half an inch being sufficient for the blades above referred to. The holder 29 having been filled with blades, coppers, and plates 35, as above described, the entire holder and its contents are thoroughly heated, preferably out of contact with air or in a reducing atmosphere, to a suitable temperature to produce the desired degree of hardness. This may be done by burying the holder and contents in a quantity of carbonaceous material contained in a muffle and then heating the muffle. Assuming the tank 2 to be filled with water, the heated holder is then immediately placed in the frame 17, as shown in Fig. 5, whereupon the combined weight of the frame and the holder and its contents will overbalance the counterweight 19 and cause said frame and holder to descend into the lowermost position of the frame, thus bringing the edges of the hot stacks opposite the discharge-openings, respectively. The latch 27 is then immediately released, thus causing the valve 8 to open, whereupon the water in the tank 2 rushes down through the pipe 7 and out through the channels 12, from which it is forcibly projected directly against the contents of the holder 29. By the action of this stream of water the heat of the blades is abstracted from them with sufficient rapidity and uniformity to produce a chilling effect equal to that resulting from the plunging of an individual hot blade into cold water, the heat being abstracted through the quick conducting interleaved coppers 34. Inasmuch as copper contracts more than steel for a given drop in temperature, the stacks in the copper-holder 29 will be somewhat compressed by the cooling of said holder, thus preventing any water from getting between the coppers and the blades and avoiding any possible oxidation of the latter. After the water contained in the tank 2 has been discharged through the channels 12, as above described, the frame 17 is raised to the position shown in Fig. 2, the holder 29 is removed therefrom, the screw-bolts 37 are turned in sufficiently to enable the wedges 38 to be withdrawn, the pins 36 are driven out of the stacks, and the blades and coppers are then removed and separated.

The razor-blades above referred to are about one and three-fourths inches long and seven-eighths of an inch wide and have a thickness of about five or six one-thousandths of an inch, and in this case it has been my practice to use for the hardening process copper sheets having a thickness of about one thirty-second of an inch and made enough larger than the blades to overlap the latter on each edge about one-eighth to three-sixteenths of an inch. For thicker blades or other articles thicker copper sheets should be used.

While the apparatus above described is a convenient and practical apparatus for use in practicing my method, yet my invention is evidently not limited to the use of this or any other specific apparatus.

My apparatus herein described is not claimed herein, being claimed in another application filed by me on the 26th day of May, 1904, Serial No. 209,967.

I claim as my invention—

1. The herein-described method of hardening thin steel articles which consists in interleaving said articles with sheets of metal of relatively high heat conductivity as compared with steel, confining said articles and sheets in a stack, heating said stack, and subjecting the hot stack to the action of a chilling medium, substantially as described.

2. The herein-described method of hardening thin steel articles, which consists in interleaving said articles with sheets of metal of relatively high heat conductivity, confining said articles and sheets in a stack with the edges of said sheets projecting beyond the edges of said articles, heating said stack, and subjecting the hot stack to the action of a chilling medium.

3. The herein-described method of hardening thin steel articles, which consists in interleaving said articles with sheets of metal of relatively high heat conductivity as compared with steel, confining said articles and sheets in a stack, heating said stack and subjecting the hot stack to the action of a flow of cold liquid.

4. The herein-described method of hardening thin steel articles, which consists in interleaving said articles with sheets of metal of relatively high heat conductivity, confining said articles and sheets in a stack with the edges of said sheets projecting beyond the edges of said articles, heating said stack, and subjecting the hot stack to the action of a flow of cold liquid.

In testimony whereof I have hereunto subscribed my name this 22d day of September, 1903.

WILLIAM E. NICKERSON.

Witnesses:
E. D. CHADWICK,
JOSEPH T. BRENNAN.